REMARKS/ARGUMENTS

The above amendments and these remarks are in response to the Office action mailed on August 24, 2006. The specification has been amended for clarity. Claims 1, 5, 25 and 28 have been amended for clarity. Claims 40-49 have been canceled as being directed to a non-elected invention. Claims 1-3, 5-12 and 25-39 are now pending in this application. Reconsideration on the basis of the above amendments and remarks below is kindly requested.

The Examiner rejected claims 1-3, 5-12 and 25-39 under 35 §112, 2nd paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 1 and 25 have been amended to overcome this rejection.

Claim 1 has been amended to be directed to a method for manufacturing a cutting element and requires selecting a substrate at least a portion of which has a density that is less than 100% of full density and that "the density is selected for reducing a constraint provided by the substrate on the ultra hard material shrinkage during sintering to a desired level of constraint from a level of constraint that would have been provided had the at least a portion of the substrate had a density of 100% of full density." Claim 25 has also been amended to be directed to a method of manufacturing a cutting element comprising selecting a substrate having a first portion that has a first density less than 100% of full density, and a second portion that has a second density that is different from the first density" and further requires that "the densities of the two portions are chosen to reduce a constraint to the ultra hard material shrinkage provided by the substrate during sintering to a desired level of constraint less than a level of constraint that would have been provided had said first and second portions each had a density of 100% of full density."

The Examiner rejected claims 1, 7-12, 17-24 and 34-36 under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over Komanduri, U.S. Patent No. 4,797,138. Komanduri discloses a polycrystalline diamond and cBN cutting tool. Komanduri does not disclose a method of manufacturing a cutting element which requires

selecting a substrate at least a portion of which has a density that has less than 100% of full density, and that such density is selected for reducing a constraint provided by the substrate on the ultra hard material shrinkage during sintering to a desired level of constraint. Consequently, Komanduri cannot anticipate nor render obvious claim 1.

Claims 7-12 and 34-36 are directly or indirectly dependent from claim 1. As such Applicants submit that claims 7-12 and 34-36 are also not anticipated by Komanduri or rendered obvious as being dependent from a claim that is not anticipated or rendered obvious by Komanduri and for the additional limitations that these claims contain therein. For example, claim 34 requires that the density is selected to minimize the constraint provided by the substrate to the ultra hard material shrinkage during sintering. Claim 35 requires that the substrate and the ultra hard material shrink during sintering and that the density is selected to minimize the shrinkage difference between the substrate and the ultra hard material during sintering. Komanduri does not appear to disclose, teach or suggest the selection of the density of the substrate for minimizing the constraint provided by the substrate to the ultra hard material shrinkage during sintering, or the selection of a substrate density which minimize the shrinkage difference between the substrate and the ultra hard material during sintering.

The Examiner rejected claims 1-3, 5, 6, 8-12, 25-33 and 37-39 under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over Aronsson et al., U.S. Patent No. 4,764,434. Aronsson et al. discloses diamond tools for rock drilling and machining. Aronsson et al. does not disclose a method for forming a cutting element wherein a substrate is selected having a portion of which has a density that is less than 100% of full density and that density is selected for reducing a constraint provided by the substrate of the ultra hard material shrinkage during sintering to a desired level of constraint. Furthermore, Aronsson et al. does not appear to disclose a method of manufacturing a cutting element comprising selecting a substrate having a first portion that has a first density less than 100% of full density and a second portion that has a density that is different from the first density, and that requires that the densities of the two portions are chosen to reduce a constraint to the ultra hard material shrinkage provided by the substrates during sintering to the desired level of constraint.

Aronsson et al. does not appear to disclose obtaining a desired level of constraint during sintering. Consequently, Aronsson et al. cannot anticipate nor render obvious claims 1 and 25.

Claims 3, 5, 6 and 8-12 are directly or indirectly dependent from claim 1. Claims 26-33 and 37-39 are dependent from claim 25. As such, these claims are also not anticipated nor rendered obvious over Aronsson et al. as being dependent from claims that are not anticipated nor rendered obvious by Aronsson et al. and for the additional limitations that these claims contain therein. For example, claim 5 requires that the substrate comprises an outer portion surrounding an inner portion, and that the outer portion of the substrate has a density less than 100% of full density and the inner portion of the substrate is fully densified. Aronsson et al. does not appear to disclose, teach or suggest a substrate which has an outer portion surrounding an inner portion, and that the outer portion has a density that is less than 100% and the inner portion is fully densified. Moreover, claim 37 requires that the densities are selected to minimize a constraint provided by the substrate to the ultra hard material during sintering, and claim 38 requires that the densities are selected to minimize the shrinkage difference between the substrate and the ultra hard material during sintering. Aronsson et al. does not appear to disclose, teach or suggest minimizing the constraint provided by the substrate on the ultra hard material during sintering, nor minimize the shrinkage difference between the substrate and the ultra hard material during sintering.

The Examiner rejected claims 1-3, 6, 8-11, 25-30, 32, 33 and 37-39 under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over Burnand et al., U.S. Patent No. 4,802,895. Burnand et al. discloses a composite diamond abrasive compact. However, Burnand et al. also does not appear to disclose, teach, suggest or speak of selecting a density of the substrate for reducing a constraint provided by the substrate of the ultra hard material shrinkage during sintering to a desired level of constraint, or selecting the densities of the two portions of the substrate to reduce a constraint to the ultra hard material shrinkage provided by the substrate during sintering to a desired level of constraint as required by claims 1 and 25 respectively. Consequently, Burnand et al. cannot anticipate nor render obvious claims 1 and 25.

Claims 2, 3, 6 and 8-11 are directly or indirectly dependent from claim 1. Claims 26-30, 32, 33 and 37-39 are dependent from claim 25. As such, Applicants submit that these claims are also not anticipated nor rendered obvious by Burnand et al. as being dependent from claims not anticipated or rendered obvious by Burnand et al. and for the additional limitations that they contain therein. For example, claim 37 requires that the densities are selected to minimize the constraint provided by the substrate to the ultra hard material during sintering. Claim 38 requires that the densities are selected to minimize the shrinkage difference between the substrate and the ultra hard material during sintering. Burnand et al. does not speak of minimizing such constraints or minimizing the difference between the shrinkage of the substrate and the ultra hard material during sintering. Consequently, Burnand et al. cannot anticipate or render obvious these claims.

The Examiner rejected claims 1-3, 5, 6, 8-11, 25-30, 32, 33 and 37-39 under 35 U.S.C. §102(b) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being obvious over Hall et al., U.S. Patent No. 4,604,106. Hall et al. discloses a composite polycrystalline diamond compact. However, Hall et al. also does not appear to disclose, teach or suggest the selection of a substrate density for reducing a constraint provided by the substrate on the ultra hard material shrinkage during sintering to a desired level of constraint, nor the selection of densities of the two portions of a substrate for reducing a constraint to the ultra hard material shrinkage provided by the substrate during sintering to a desired level of constraint, as required by claims 1 and 25. Consequently, Hall et al. cannot anticipate nor render obvious claims 1 and 25.

Claims 3, 5, 6 and 8-11 are directly or indirectly dependent from claim 1. Claims 26-30, 32, 33 and 37-39 are dependent from claim 25. As such, Applicants submit that these claims are also not anticipated nor rendered obvious by Hall et al. as being dependent from claims that are not anticipated nor rendered obvious by Hall et al. and for the additional limitations that these claims contain therein. For example, claim 5 requires that selecting a substrate comprises selecting a substrate comprising an outer portion surrounding an inner portion wherein the outer portion of the substrate has a density less than 100% of full density of said outer portion and the

inner portion of the substrate is fully densified. Hall et al. does not appear to disclose selecting a substrate having an outer portion surrounding an inner portion and which outer portion of the substrate has a density that is less than 100% of full density as required by claim 5. Furthermore, Hall et al. does not appear to disclose that the densities of the substrate portions are selected to minimize the constraint provided by the substrate to the ultra hard material during sintering as required by claim 37, nor that the densities are selected to minimize the shrinkage difference between the substrate and the ultra hard material during sintering.

The Examiner rejected claims 1, 7 and 34-36 under 35 U.S.C. §103(a) as being unpatentable over Vale et al., U.S. Patent No. 6,779,951 in view of Bovenkerk et al., U.S. Patent No. 4,311,490. Vale et al. discloses a drill insert using a sandwich polycrystalline diamond compact and a method of making the same, and Bovenkerk et al. disclosed a diamond and cubic boron nitride abrasive compact using size selective abrasive particle layers. However, neither of these two references appear to disclose, teach or suggest the selection of a density of a substrate when making a cutting element which density is selected for reducing a constraint provided by the substrate on the ultra hard material shrinkage during sintering to a desired level of constraint. Consequently, these references alone or in combination, cannot render claim 1 obvious.

Claims 7 and 34-36 are dependent from claim 1. As such, Applicants submit that these claims are also not rendered obvious by Vale et al. in view of Bovenkerk et al. as being dependent from a claim that is not rendered obvious by Vale et al. in view of Bovenkerk et al. and for the additional limitations that they contain therein. Again, claim 34 requires that the density is selected to minimize the constraint provided by the substrate to the ultra hard material shrinkage during sintering. Claim 35 requires that the density is selected to minimize the shrinkage difference between the substrate and the ultra hard material during sintering. Neither Vale et al. nor Bovenkerk et al. appear to disclose, teach or suggest minimizing the constraint as required by claim 34 or minimize the shrinkage difference as required by claim 35.

In rejecting the claims, the Examiner argued that the cited references disclose the same method as Applicants, that being to sinter ultra hard material with a substrate having at least a portion which is not fully densified which provides reduced shrinkage constraint compared to

sintering the material in contact with a full density substrate. However, Applicants fail to see where the cited references disclose the selection of a substrate density for the purpose of reducing to a desired level the constraint provided by the substrate on the ultra hard material shrinkage during sintering. Neither of the cited references appear to disclose such feature.

The rejections and objections to all claims pending in this application are believed to have been overcome and this application is now believed to be in condition for allowance. Should the Examiner have any remaining questions or concerns about the allowability of this application, the Examiner is kindly requested to call the undersigned attorney to discuss them.

Respectfully submitted,
CHRISTIE, PARKER & HALE, LLP

By _____
Constantine Marantidis
Reg. No. 39,759
626/795-9900

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